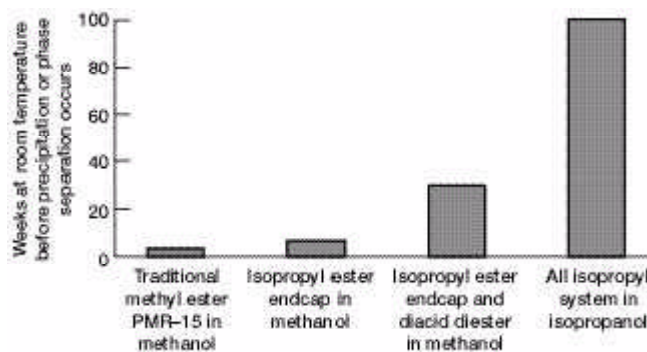


PMR Extended Shelf Life Technology

Given 2000 R&D 100 Award

An approach developed at the NASA Glenn Research Center for extending the shelf life of PMR polyimide solutions and preregs received an R&D 100 Award this year. PMR polyimides, in particular PMR-15, have become attractive materials for a variety of aerospace applications because of their outstanding high-temperature stability and performance. PMR-15 can be used in components with exposures to temperatures as high as 290 °C, which leads to substantial reductions in weight, as much as 30 percent over metal components. PMR-15 composites are used widely in aerospace applications ranging from ducts and external components in aircraft engines to an engine access door for the Space Shuttle Main Engine. A major barrier to more widespread use of these materials is high component costs. Recent efforts at Glenn have addressed the various factors that contribute to these costs in an attempt to more fully utilize these lightweight, high-temperature materials.

During storage, standard PMR polyimide solutions and preregs undergo chemical reactions that lead to the buildup of higher molecular weight species. These chemical changes affect processability and can lead to higher part rejection and scrap rates, ultimately resulting in higher component costs. The stability of PMR preregs and solutions can be improved by refrigeration. However, this adds to shipping and storage costs, thereby increasing manufacturing costs.



*Comparison of the storage lives of traditional and extended shelf-life PMR solutions.
(Solution stability via time to precipitate.)*

This new technology increases the storage life of PMR polyimide solutions by almost a factor of 30 over standard PMR resin chemistry (see the figure). Use of extended shelf life PMR solutions and preregs can make processing more repeatable and can reduce manufacturing costs by reducing scrap rates and unnecessary storage and handling costs.

Find out more about this research.

(<http://www.grc.nasa.gov/WWW/MDWeb/5150/Polymers.html>)

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Special recognition: A Glenn-developed approach to extending the shelf life of PMR polyimide solutions and prepregs was a recipient of this year's R&D-100 Award.